900373

(18)

"INERT INGREDIENTS OF PESTICIDE FORMULATIONS"
SURFACE ACTIVE AGENT EVALUATION FORM

Format IV

A. EPA Accession Number and Name

000998 Stearic acid, ammonium salt of

B. American Chemical Society Chemical Abstracts Service (CAS) Name and Registry Number

1002-89-7

Octadecanoic acid, ammonium salt

C. Other Names

(EPA S): Ammonium stearate

D. Chemical Composition

C18-H36-02.H3-N

E. Molecular Structure

CH3-C16-H32-C-ONH4

$C_{17}H_{35}COONH_4$

F. Surfactant Class

Fatty acids: soaps

G. Physical Data

1. Trade name, equivalent chemical name, manufacturer, state, product concentration, H.L.B.
Nopco Chemical Division, Norac Co., Inc. (4)

2. Solubility - at 80°F; soluble in methanol, ethanol; slightly soluble in water, benzene, xylene, naptha (1)

3. Ionic Character

4. Other physical data - yellow white powder; (MP) 70°-75°F (1)

H. Usage

1. In pesticidal formulations - surfactant (2)

2. General - in vanishing creams, in the waterproofing of cements (1)

I. Government Regulations - EPA 40 CFR 180.1001: Residues exempt from the requirement of a tolerance when used in accordance with good agricultural practice as an inert ingredient in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. (3)

FDA 21 CFR 121.101 - Stearic acid is Generally Recognized as Safe (GRAS) for use in foods. (3)

J. Environment

Stearic acid and ammonia can both be produced normally in nature. They are both degraded by natural systems.

The following is a summary of the results of a biodegradation study of a series of fatty acids and soaps.

The sodium soaps up through C18 are metabolized by bacteria; degradation was slower with greater chain length in the series C8, C12, C16, C18, C20. It was found that unsaturated soaps were degraded more readily than the corresponding saturates. Concentrations used were of 300-400 ppm in most cases, but concentrations of several thousand ppm did not appear to be toxic to bacteria, at least in the case of oleates. (7)

K. Toxicology

Numerous dermatological studies have revealed that among the saturated fatty soaps, C8 and C10 are highly irritating, C12 is much less irritating and C14 to C18 the blandest. High alkalinity is also conducive to irritation. The primary causes of irritation seem to be either a defatting action or protein denaturation. In general, though, long straight-chain products are less irritating than short, branched-chain products. (8)

Any toxic effects of ammonium stearate would be due to the ammonium ion. Stearic acid occurs as a glyceride in many plant and animal oils and is therefore a normal dietary component for most animals. No specific toxicity data is available for ammonium stearate.

The healthy human body has a high capacity to convert NH_3 or NH_4^+ into harmless urea. With large doses there arises the possibility of sufficient absorption to produce a diuresis and systemic ammonia poisoning, especially if the material is administered parenterally. (5) The human Oral LD50 for an aqueous ammonia solution (44% ammonia) was 43 mg/kg. (6)

Ammonia vapors cause eye and respiratory tract irritation. High concentrations may cause conjunctivitis, laryngitis, tracheitis and pulmonary edema or pneumonitis. Ammonia contact with skin can cause burns and vesication. If systemic absorption of ammonia becomes excessive, coma may arise, perhaps preceded by a period of hypertonus and convulsions. (5) For gaseous form of ammonia, the inhalation LC50 for mice was 4837 ppm/1 hr. (6)

L. Recommendation: Class 4

Group 26. Fatty Acids: Soaps

With the exception of potentially harmful heavy metal salts of fatty acids such as barium, cadmium, or zirconium, members of this group of surfactants, when used as inert ingredients in pesticides, pose no hazard to the health of animals or man.

M. Bibliography

(1) The Merck Index, Merck and Co., Rahway, New Jersey: 1976.
(2) U.S. E.P.A., Code of Federal Regulations; 40, part 180.1001, Washington, D.C.: 1976.
(3) U.S. F.D.A., Code of Federal Regulations; 21, part 121.101, Washington, D.C.: 1976.
(4) Oil, Paint and Drug Reporter, OPD Chemical Buyers Directory, Schnell Publishing Co., New York: 1974.
(5) Gleason, M.N., et al, Clinical Toxicology of Commercial Products, Williams and Wilkins 3rd ed., Baltimore: 1969.
(6) National Institute of Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances, U.S. G.P.O., Washington, D.C.: 1976.
(7) Swisher, R.D., Surfactant Biodegradation, Marcel Dekker Inc., New York: 1970.
(8) Schwartz, A.M.; J.W. Perry; J. Berch, Surface Active Agents and Detergents, Interscience Publishers, Inc., New York: 1966.

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